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Mechanical Positioning Device for Langmuir Probe

The Langmuir probe is frequently used to measure the properties of plasmas. For simple systems, a probe fixed in one position is adequate, but when plasmas in large-volume systems are to be studied, it is quite desirable to have a movable probe. In the past, positioning systems have been limited to movement in one plane, and a different probe and positioning device has been used to measure properties in another plane. Unfortunately, substitution of one system for another has led to difficulties in the correlation of data from the separate systems.

A mechanical positioning device for a Langmuir probe has been developed to permit probe movement in two planes; it also provides accurate information as to the location of the probe tip in a closed chamber.

The device consists primarily of a probe carriage unit which is moved forward or backward inside a rectangular frame by a motor-driven lead screw. The carriage unit supports one end of the Langmuir probe in a retainer socket centered upon a gear and the other end slides in a slot in the frame which acts as a guide for the carriage unit. The lead screw has a worm gear at one end which drives a rotary potentiometer; with appropriate readout instrumentation, accurate information as to the axial position of the probe tip can be obtained. The retainer-socket gear

is driven by a motor to rotate the probe (when it has an offset termination) and accurate information on the radial position of the probe is provided by a potentiometer that is coupled to the retainer socket drive.

The unit is lightweight and portable; it can also be used to position probes in nozzles, ducts, and other chambers for measurements of flow and temperature.

Note:

Requests for further information may be directed to:

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NASA has decided not to apply for a patent.

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